

SPECIFICATION AMENDMENTS

On page 1, insert above line 1, insert--Priority Claim

The present application claims priority on European Patent Application 03104118.9 filed 7 November 2003.--

On page 1, delete line 1.

On page 1, above line 1, insert--Field of the Invention--

On page 1, above line 13, insert--Background of the Invention--

Paragraph on line 25 of page 1, ending on line 2 of page 4, has been amended as follows:

~~--The method according to the preamble of claim 1 is known from UK patent application GB 2295409 describes a known method for interconnecting electrical conduits.~~

In the known method a static pin connector part is arranged co-axially in a well and a moveable box connector part is landed on top of the pin connector part such that debris can be discharged into the borehole. US patent 5132624 discloses a downhole electrical connector with a central throughbore to permit passage of debris.--

On page 2, delete lines 5-16.

Paragraph on line 18 of page 2 has been amended as follows:

~~--The present inventions include a~~ The method according to the invention for dispersing gas bubbles in a multiphase fluid transportation conduit comprises inserting at least one bubble breaker assembly in the tubing, which assembly comprises a plurality of orifices that are located in a substantially eccentric position relative to a central axis of the tubing, ~~characterised in that~~ which lift gas is injected at one ore more downhole gas injection points spaced along the length of the production tubing to enhance oil production from the well, and that one or more bubble breaker assemblies with eccentric orifices are arranged at selected distances downstream of the lift gas injection points.--

On page 2, above line 31, insert the following paragraph:

--The present invention include a method of producing crude oil, wherein large gas slugs, that are known as are Taylor bubbles, are broken up into finely dispersed smaller gas

bubbles by means of one or more bubble breaker assemblies with eccentric orifices in accordance with the method for dispersing gas bubbles in a production tubing in an oil production well, the method comprising inserting at least one bubble breaker assembly in the tubing, which assembly comprises a plurality of orifices that are located in a substantially eccentric position relative to a central axis of the tubing, wherein lift gas is injected at one or more downhole gas injection points spaced along the length of the production tubing to enhance oil production from the well, and that one or more bubble breaker assemblies with eccentric orifices are arranged at selected distances downstream of the lift gas injection points.—

On page 2, above line 31, but after the paragraph above, insert the following paragraph:

—The present invention include a system for dispersing gas bubbles in a production tubing in an oil production well, the system comprising at least one bubble breaker assembly which is arranged within the tubing, which assembly comprises a plurality of orifices that are located in a substantially eccentric position relative to a central axis of the tubing wherein one or more downhole lift gas injection points are arranged along the length of the production tubing to enhance oil production from the well, and that one or more bubble breaker assemblies with eccentric orifices are arranged at selected distances downstream of the lift gas injection points.—

On page 2, delete lines 31-34.

On page 3, delete lines 1-34.

On page 4, delete lines 1-14.

On page 5, above line 17, insert the following paragraphs:

—It has been found that the use of a bubble breaker assembly in which a plurality of eccentric orifices are arranged significantly enhances the dispersion of relatively large gas bubbles into a large amount of small gas bubbles, which are uniformly distributed in the multiphase fluid stream.

In an embodiment a flow restriction may comprise a disk-shaped plate in which at least two eccentric orifices are arranged, and which disk may be removably secured to the inner wall of the conduit, for example by a clamping assembly which can be contracted if the plate needs to be removed.

Preferably a plurality of flow restrictions are arranged at selected distances along the length of the conduit, wherein at least two of said flow restrictions comprise disk-shaped plates in which different patterns of eccentric orifices are arranged

In an embodiment at least one flow restriction may comprise a pair of eccentric orifices that are located substantially symmetrically relative to a plane of symmetry in which the central axis of the conduit lies.

Alternatively at least one flow restriction may comprise three or more equidistant eccentric orifices that are arranged at regular angular intervals relative to a longitudinal axis of the conduit.

In the fluid stream downstream of the gas-injection point(s) the gas bubbles will tend to coalesce into steadily growing larger gas bubbles, known as gas slugs or Taylor bubbles, and by arranging a series of bubble breakers according to the invention, each with eccentric orifices, an intensively mixed low density multiphase stream of crude oil and uniformly distributed small gas bubbles is created throughout the length of the production tubing.

The invention also relates to a system for dispersing gas bubbles in a multiphase fluid transportation conduit, which system comprises at least one bubble breaker assembly which is arranged within the tubing, which assembly comprises a plurality of orifices that are located in a substantially eccentric position relative to a central axis of the tubing characterised in that one or more downhole lift gas injection points are arranged along the length of the production tubing to enhance oil production from the well, and that one or more bubble breaker assemblies with eccentric orifices are arranged at selected distances downstream of the lift gas injection points.--

Paragraph on line 31 of page 7, ending on line 6 of page 8, has been amended as follows:

~~—A key aspect of the bubble breaker assemblies 16 and 26 according to the present invention is that the~~ The eccentric orifices 18, 28 break up the gas slugs of Taylor bubbles 15, 36 into a large amount of finely dispersed smaller gas bubbles 25, 37 that only re-coalesce slowly into larger bubbles. Preferably the gas bubbles formed have a diameter less than about 1 millimeter, so that microbubbles are formed which are highly resistant to re-coalescence into large Taylor bubbles 15, 36.--

Paragraph on line 17 of page 8 has been amended as follows:

-- Experiments revealed that the pressure loss associated with the bubble breaker assembly 16, 26 with eccentric orifices 18, 28 according to some embodiments of the invention is small compared to the beneficial pressure effect of the low density bubbly flow it creates, often only one-tenth the magnitude. Therefore there is a net reduction in the bottom hole pressure in the crude oil inflow region of the well 1, 31 and an increase in the crude oil production rate of the well 1, 31.--

Paragraph on line 14 of page 9 has been amended as follows:

-- Computer simulations of the method according to some embodiments of the invention indicate that crude oil production increase of as much as 20% can result.--

Paragraph on line 17 of page 9 has been amended as follows:

--Figure 5 shows the gas-lift performance curve for a typical 3000 m deep gas lifted oil well with and without bubble breakers according to the invention. The lower curve 55 shows the gas lift performance of a gas lifted oil well without bubble breakers and the upper curve 56 shows the gas lift performance of a gas lifted well with a bubble breaker assembly 16, 26, or 50 according to some embodiments of the ~~present~~ invention as illustrated in Figures 1-4.--

Paragraph on line 31 of page 9, ending on line 8 of page 10 has been amended as follows:

--In Figure 5 the horizontal axis represents the gas injection rate Q_g (sm^3/day) and it can be seen that for gas injection rates less than $80.000 \text{ sm}^3/\text{day}$ the amount of crude oil Q_l (m^3/day) produced by a gas-lifted oil production well equipped with a bubble breaker assembly 16, 26 according to some embodiments of the invention is significantly higher than of the same gas lifted well without bubble breakers according to the invention. It is observed that the unit sm^3 refers to standard cubic meters, which is the volume of the injected gas at atmospheric pressure.--

Paragraph on line 29 of page 11, ending on line 2 of page 12, has been amended as follows:

—Observations with a high speed camera revealed that the eccentric orifices according to some embodiments of the invention generated a large amount of turbulent eddies in the fluid stream and that the air bubbles were broken over and over again by these eddies in the region of the bubble breaker until they had a diameter of one or a few millimeters.--

On page 13, above line 1, insert --We claim:--